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Dynamic properties of vortex states as modeled by the disordered 3D uniformly frustrated XY model PETER OLSSON, Umea University, Sweden — Dynamic properties of the uniformly frustrated 3D XY model with point disorder are studied as a model of vortex flow in high temperature superconductors. Using both Monte Carlo and Resist Shunted Junctions dynamics, we compute the resistivity of the interacting vortex system both from equilibrium voltage fluctuations and from the response to a finite driving current. For a sufficiently strong disorder we find a non-trivial behavior: In the solid phase the resistance is very low, suggestive of a pinned vortex line lattice, but increases rapidly at the melting transition. In the simulations with a finite current we find that the same behavior is seen only for very small currents $I \approx 10^{-4}$. For larger currents the voltage instead decreases at the melting of the vortex lattice. This seems to be due to the increasing adjustment of the vortex lines to the pinning potential in the liquid phase.

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